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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,783	09/19/2003	John R. Grassi	GISZ 2 00034	6732
7590 11/02/2005			EXAMINER	
Jay F. Moldovanyi Fay, Sharpe, Fagan, Minnich & McKee, LLP 7th Floor 1100 Superior Avenue Cleveland, OH 44114-2518			LIN, ING HOUR	
			ART UNIT	PAPER NUMBER
			1725	
DATE MAILED: 11/02/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/665,783	<b>Applicant(s)</b> GRASSI ET AL.	
	<b>Examiner</b> Ing-Hour Lin	<b>Art Unit</b> 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 and 31-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 and 31-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/11, 21/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 23-24, 26-29 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easwaran in view of Challand.

Easwaran (col. 4, lines 3+) teaches the claimed assembly for the lost pattern casting of metal, comprising: a shell mold produced by forming a polystyrene foam pattern with the use of gates and risers and forming an aggregate coating on the pattern; and an aggregate backing around the coated pattern, wherein the backing is contained in a container or flack.

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Easwaran fails to teach the use of a water-soluble binder for forming an erodable coating and an erodable backing. However, Challand (col. 3, lines 7+) teaches the use of a water-soluble binder including polyphosphate chains and /or borate ions and silica sand for the purpose of forming a water dispersible mold including an erodable coating and an erodable backing in casting metal without the need of a container or flask because the backing is self-support or free-standing backing when the binder is used. It would have been obvious to one having ordinary skill in the art to provide Easwaran the use water soluble binder as taught by Challand in order to effectively form a water soluble mold including an erodable coating on the pattern and an erodable self-support or free-standing backing around the coated pattern.

4. Claims 7-8, 12, 25, 34-41, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easwaran in view of Challand and further in view of either Pineda et al, Sahari, or Conroy et al.

Easwaran in view of Challand fails to teach the use of controlling the dose of binder or the use of water nozzle. However, Pineda et al (col. 6, lines 28+) teach the use of controlling and reducing binder (col. 6, lines 66+) and increasing silica sand or filler for the purpose of making the investment softer and easier to remove it from the casting metal. Sahari (col. 6, lines 24+) teaches the use of nozzles (water jet, water-steam jet) and submerging the mold into water for the purpose of cooling and removing casting from the re-using the binder agent. Conroy et al (col. 4, lines 19+) teach the use of nozzles 20 and flow rate and pressure of fluid including water and surfactant for the purpose of removing cores from castings. It would have been obvious to one having ordinary skill in the art to provide Easwaran in view of Challand the use

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of controlling the dose of binder or the use of water nozzle as taught by either Pineda et al, Sahari or Conroy et al in order to effectively make the backing investment softer and easier to remove it from the casting metal or rapid cool the casting in the molten state and remove or crack the water soluble mold from the casting.

5. Claims 1-6, 9-11, 13-17, 22 and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easwaran in view of Challand and further in view of Carter et al and Pineda et al.

Easwaran in view of Challand fails to teach the use of rapid cooling and removing a portion of the water dispersible mold. However, Carter (col. 2, lines 47+) teaches the use of rapid cooling such as simultaneous molten metal pouring and immersion cooling for the purpose of forming a fine grain and reducing oxidation pitting for the casting. Pineda et al (col. 6, lines 28+) teach the use of dropping the mold into water in order to remove or crack a portion of the water dispersible mold. It would have been obvious to one having ordinary skill in the art to provide Easwaran in view of Challand the use of rapid cooling and removing or cracking a portion of the water dispersible mold as taught by Carter et al and Pineda et al in order to reduce cycle time of casting and refine the grain size.

6. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easwaran in view of Challand and further in view of Carter et al and Pineda et al and Conroy et al.

Easwaran in view of Challand and further in view of Carter et al and Pineda et al fails to teach the use of nozzles and control of flow. However, Conroy et al (col. 4, lines 19+) teach the

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use of nozzles 20 and flow rate and pressure of fluid including water and surfactant for the purpose of removing cores from castings. It would have been obvious to one having ordinary skill in the art to provide Easwaran in view of Challand and further in view of Carter et al and Pineda et al the use of nozzles and control of flow as taught Conroy et al in order to effectively remove or crack the water soluble mold from the casting.

7. Claims 20-21 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Easwaran in view of Challand and further in view of Carter et al and Pineda et al and Watts.

Easwaran in view of Challand and further in view of Carter et al and Pineda et al fails to teach the use of solidified shell having a molten metal core or using the shell as a chill.

However, Watts (col. 8, lines 3+) teaches the use of solidified shell having a molten metal core or using the shell as a chill for the purpose of controlling cooling rate and microstructures of the casting. It would have been obvious to one having ordinary skill in the art to provide Easwaran in view of Challand and further in view of Carter et al and Pineda et al the use of solidified shell having a molten metal core or using the shell as a chill as taught by Watts in order to effectively control the cooling rate and microstructure of the casting.

### *Response to Arguments*

Applicant's arguments filed on 8/8/05 have been fully considered but they are not persuasive. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or

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modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant argued that Easwaran fails to teach the use of a water-soluble binder for forming an erodable coating and an erodable backing. However, Challand (col. 3, lines 7+) teaches the use of a water-soluble binder including polyphosphate chains and /or borate ions and silica sand for the purpose of forming a water dispersible mold including an erodable coating and an erodable backing in casting metal without the need of a container or flask because the backing is self-support or free-standing backing when the binder is used. It would have been obvious to one having ordinary skill in the art to provide Easwaran the use water soluble binder as taught by Challand in order to effectively form a water soluble mold including an erodable coating on the pattern and an erodable self-support or free-standing backing around the coated pattern.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be



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calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ing-Hour Lin whose telephone number is (571) 272-1180. The examiner can normally be reached on M-F (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*I. H. Lin*  
I.-H. Lin

10-26-05

**KEVIN KERNS** *Kevin Kerns 10/28/05*  
**PRIMARY EXAMINER**